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CATALOGED BY STIA
AS AD 14297317

Report No. 8926-107

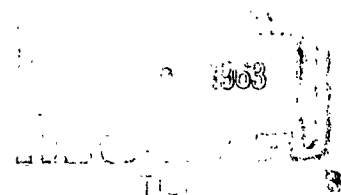
Material - Fabrics - Aluminized

Light Transmittance And Abrasion Resistance

H. Mark, J. C. George, E. E. Keller

297 317

22 September 1959



Published and Distributed
under
Contract AF 33(657)-8926



Report No. 8926-107

Material - Fabrics - Aluminized

Light Transmittance And Abrasion Resistance

Abstract

The abrasion resistance of Connecticut Hard Rubber Co., aluminized rubber coated fabric CHR and Minnesota Mining and Manufacturing Co., SRGA-0213 fabric was compared by Taber Abraser tests (1000 gram load, CS-17 wheel). The CHR was superior to the SRGA-0213 fabric and it withstood three times as many wear cycles to obtain about 1.3 per cent light transmittance in the 350 to 2000 micron wavelength range. The transmittance of various seam sealants (Los Angeles Standard Rubber Co., IA #1 to IA #6 inclusive) used to cover needle holes in SRGA-0213 was zero. Seam sealing tapes IA #1 and IA #7 (Los Angeles Standard Rubber Co.), and CHR Alt. No. 2 (Connecticut Hard Rubber Co.) displayed the following respective peel strengths: 2.51 2.06 and 5.16 pounds per inch width.

Reference: Mark, H., George, J. C., Keller, E. E.,
"Light Transmittance and Abrasion Resistance
of Various Aluminized Fabrics," General Dynamics/
Convair Report MP 59-344, San Diego, California,
22 September 1959. (Reference attached.)

SAN DIEGO

STRUCTURES & MATERIALS LABORATORIES

REPORT MP-59-344

DATE 22 September 1959

MODEL F-106

TITLE

REPORT NO. MP-59-344

LIGHT TRANSMITTANCE AND ABRASION RESISTANCE OF VARIOUS ALUMINIZED FABRICS

MODEL: F-106

CONTRACT NUMBER: AF 33(600)-36546

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REFERENCE

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NO. OF PAGES 15

NO. OF DIAGRAMS 13

W. M. Sutherland, Grp. Engr.

REVISIONS

[illegible]

ACCESS NO.

Title: MATERIAL - FABRICS - ALUMINIZED. LIGHT TRANSMITTANCE AND ABRASION RESISTANCE.

Authors: Mark, H., George, J. C., Keller, E. E.

Report No: 8926-107

Date: 22 September 1959

Contract: AF 33(600)-36546

Contractor: General Dynamics/Convair

ABSTRACT: The abrasion resistance of Connecticut Hard Rubber Co., aluminized rubber coated fabric CHR and Minnesota Mining and Manufacturing Co., SRGA-0213 fabric was compared by Taber Abraser tests (1000 gram load, CS-17 wheel). The CHR was superior to the SRGA-0213 fabric and it withstood three times as many wear cycles to obtain about 1.3 per cent light transmittance in the 350 to 2000 micron wavelength range. The transmittance of various seam sealants (Los Angeles Standard Rubber Co., LA #1 to LA #6 inclusive) used to cover needle holes in SRGA-0213 was zero. Seam sealing tapes LA #1 and LA #7 (Los Angeles Standard Rubber Co.), and CHR Alt. No. 2 (Connecticut Hard Rubber Co.) displayed the following respective peel strengths: 2.51, 2.06 and 5.16 pounds per inch width.

15 pages, 1 table, 11 figures.

ANALYSIS
PREPARED BY
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George/Keller/Sutherland

CONVAIR
A DIVISION OF AIRCRAFT DYNAMICS CORPORATION
SAN DIEGO

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OBJECT:

1. To determine the abrasion required on various aluminized fabrics to obtain 1% or more light transmittance in the 350 mu to 2000 mu range.
2. To obtain transmittance data on sewed seams in order to determine the effectiveness of sealing needle holes.
3. To obtain peel strength data on various seam tapes.

CONCLUSIONS:

1. Aluminized Fabric C.H.R. manufactured by Connecticut Hard Rubber Company, was superior to S.R.G.A.-0213, manufactured by Minnesota Mining and Manufacturing Company in abrasion resistance. The C.H.R. material required three (3) times as many wear cycles (Taber Abraser) to obtain approximately 1.3% transmittance in the 350 mu to 2000 mu range.
2. The transmittance of various seam - sealants used to cover needle holes on S.R.G.A.-0213 fabric was zero. These seam sealants, LA #1 through LA #6, were supplied by Los Angeles Standard Rubber Company.
3. Of the various seam tapes tested C.H.R. Alt. No. 2, manufactured by Connecticut Hard Rubber Company showed the greatest peel strength.

TEST SPECIMENS AND PROCEDURE:

Test Specimens:

The following specimens were subjected to abrasion and tested for light transmittance:

1. C.H.R. Aluminized rubber coated fabric (Connecticut Hard Rubber)
2. S.R.G.A.-0213 (Minnesota Mining and Manufacturing Company)

The following S.R.G.A.-0213 specimens received transmittance tests on needle holes closed using the following seam sealants:

1. LA #1 (Los Angeles Standard Rubber Company).
2. LA #2 (Los Angeles Standard Rubber Company).
3. LA #3 (Los Angeles Standard Rubber Company).
4. LA #4 (Los Angeles Standard Rubber Company).
5. LA #5 (Los Angeles Standard Rubber Company).
6. LA #6 (Los Angeles Standard Rubber Company).

ANALYSIS

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CONVAIR
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TEST SPECIMENS AND PROCEDURE: (Cont'd)Test Specimens: (Cont'd)

Peel strength tests were made on the following seam sealing materials.

1. LA #1 (Los Angeles Standard Rubber Company).
2. LA #7 (Los Angeles Standard Rubber Company).
3. C.H.R. Alt. (Connecticut Hard Rubber Company)
No. 2

Test Procedure:

Test Specimens C.H.R. and S.R.G.A.-0213 were tested with the Taber Abraser using a 1000 gram load and CS-17 wheel. Transmittances of both samples were obtained with a spectrophotometer in the 350 mu to 2000 mu range after intervals of wear cycles on the Taber Abraser until each specimen showed a transmittance of 1% or more.

Transmittances were also obtained on needle holes covered by seam sealants LA #1 thru LA #6 on S.R.G.A.-0213 fabric while the fabric in each case was drawn taut.

Peel strengths were obtained using seam tapes LA #1, LA #7 and C.H.R. Alt. No. 2. A autographic peel tester, as described in Report No. 8-07310, was used to make evaluations.

RESULTS:

The results of the transmittance tests after different wear cycles on the Taber Abraser for Fabrics S.R.G.A.-0213 and C.H.R. are shown in Figures 1 thru 4.

The results show that Fabric C.H.R. required 1500 wear cycles on the Taber Abraser to obtain a transmittance of approximately 1.3%, while Fabric S.R.G.A.-0213 required 500 wear cycles.

The results of the transmittance tests on seam sealants LA #1 thru LA #6 are shown in Figures 5 thru 11. All of these samples showed zero per cent transmission.

The results of the peel strength tests are shown in Table I. Of the various seam tapes which were tested, Fabric C.H.R. Alt. No. 2 showed the highest peel strength.

NOTE:

The data from which this Report was prepared are recorded in Engineering Test Laboratories Data Book No. 3056.

ANALYSIS
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MODEL F-106
DATE 22 Sept. 1

TABLE I

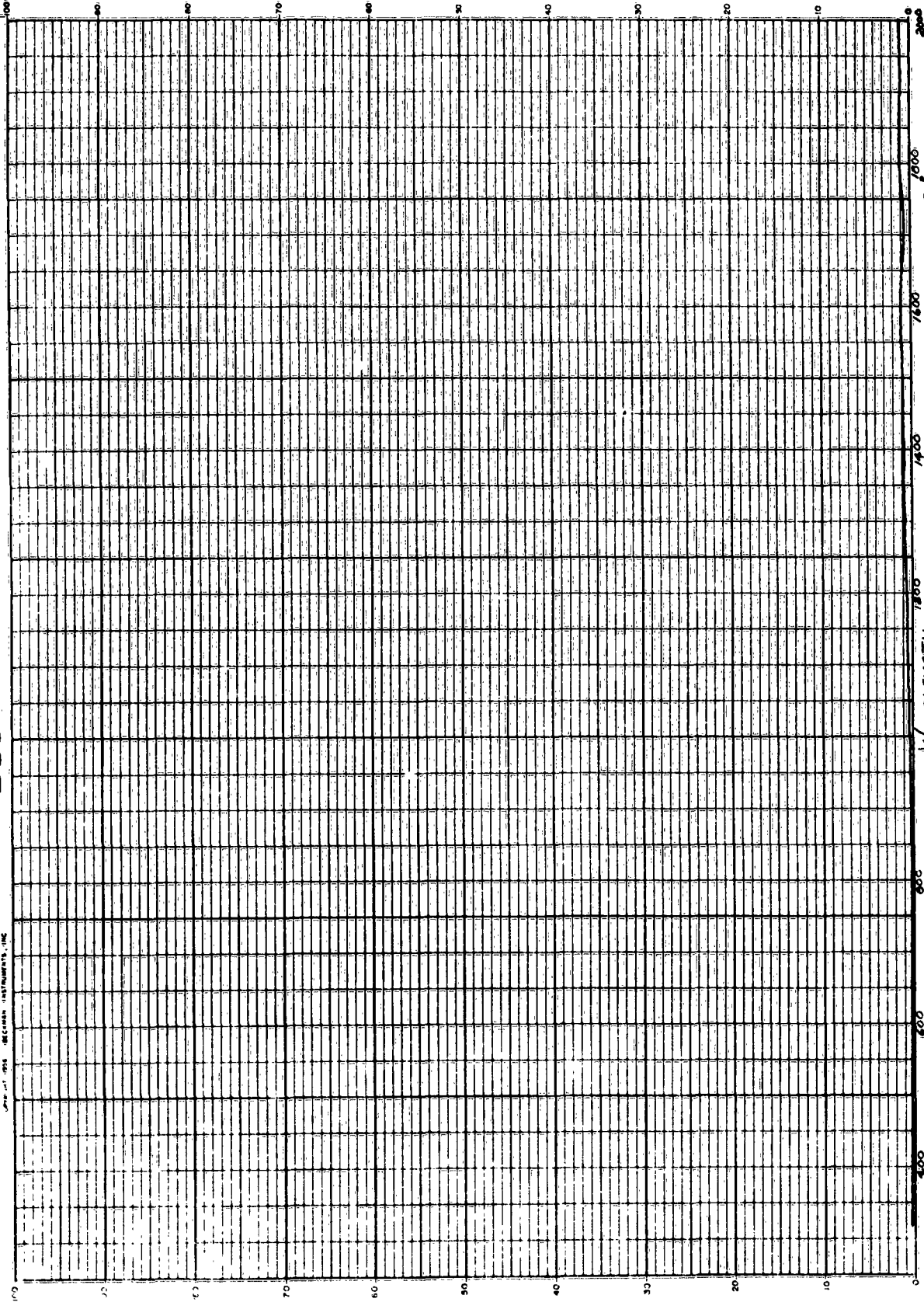
RESULTS OF PEEL STRENGTHS OF ALUMINIZED FABRICS

<u>FABRIC</u>	<u>PEEL STRENGTH (LBS./IN.)</u>
LA #1	2.51
LA #7	2.06
C.F.R. Alt. #2	5.16

Beckman DK-2 CHART

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Beckman Instruments, Inc.



SAMPLE SP-10-2-2
200 cycles

CONC. CM
ORIGIN CM
SOLVENT CM

TRANSMISSION
0-100%

SOLVENT CM
REF CM

SPEED CM MIN

SCALE 0-100

SENS 0.30

PERIOD 0.2

WAVELENGTH CM

ANALYST

DATE

Figure 1

SAMPLE SAC 0213
500-4113

CONC _____ PATH _____
ORIGIN _____
SOLVENT _____

TRANSMISSION
0-10%

REF	SOLVENT	REF
	Alc	

N SPEED 62 MIN 01-10%

SCALF_____

SENS 0.30

PERIOD 0-2

T. ✓ M. ✓ PM ✓ PG ✓

ANALYST _____

DATE _____

50 м/ч / см.

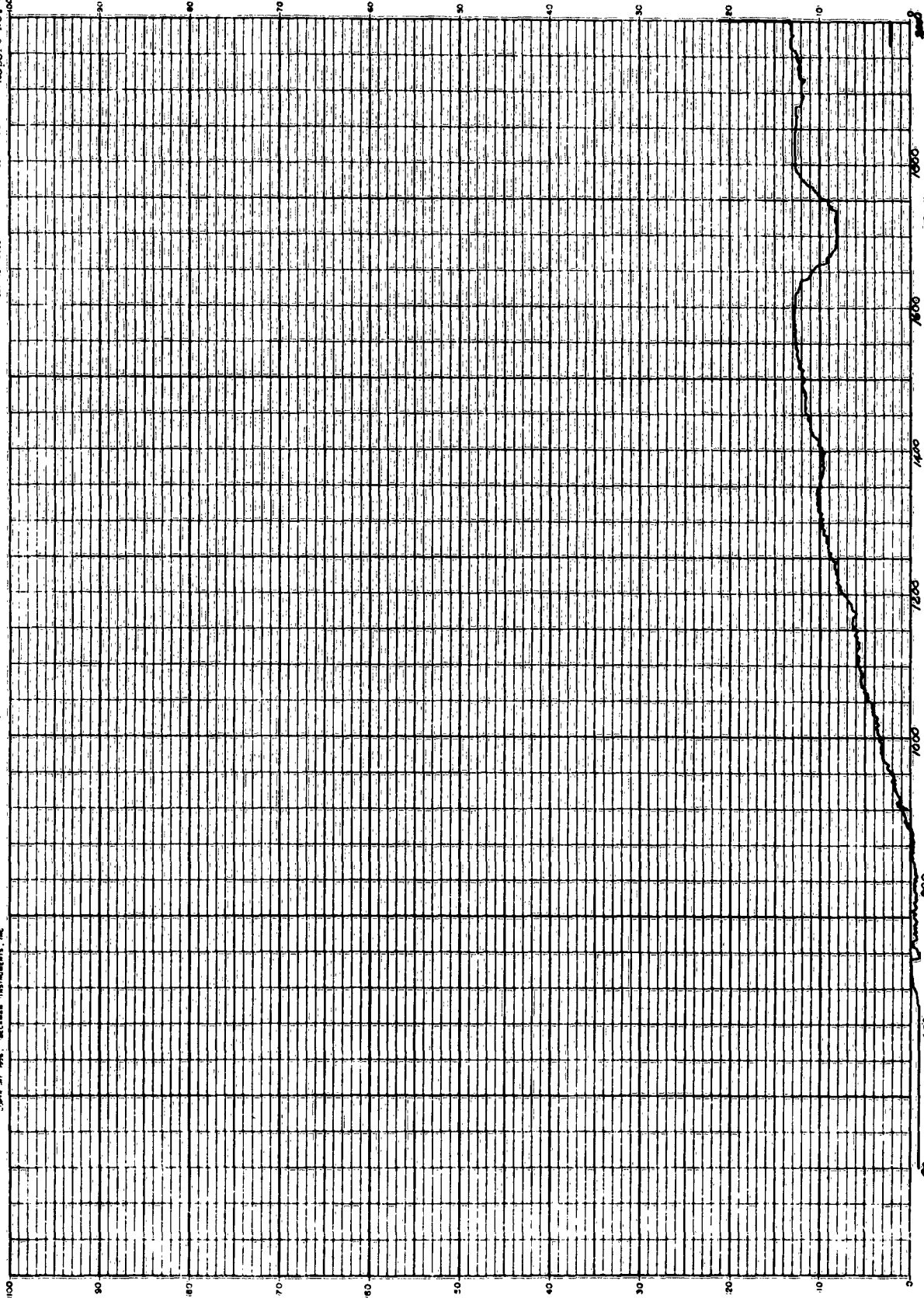


Figure 2

WAVELENGTH - $m\mu$

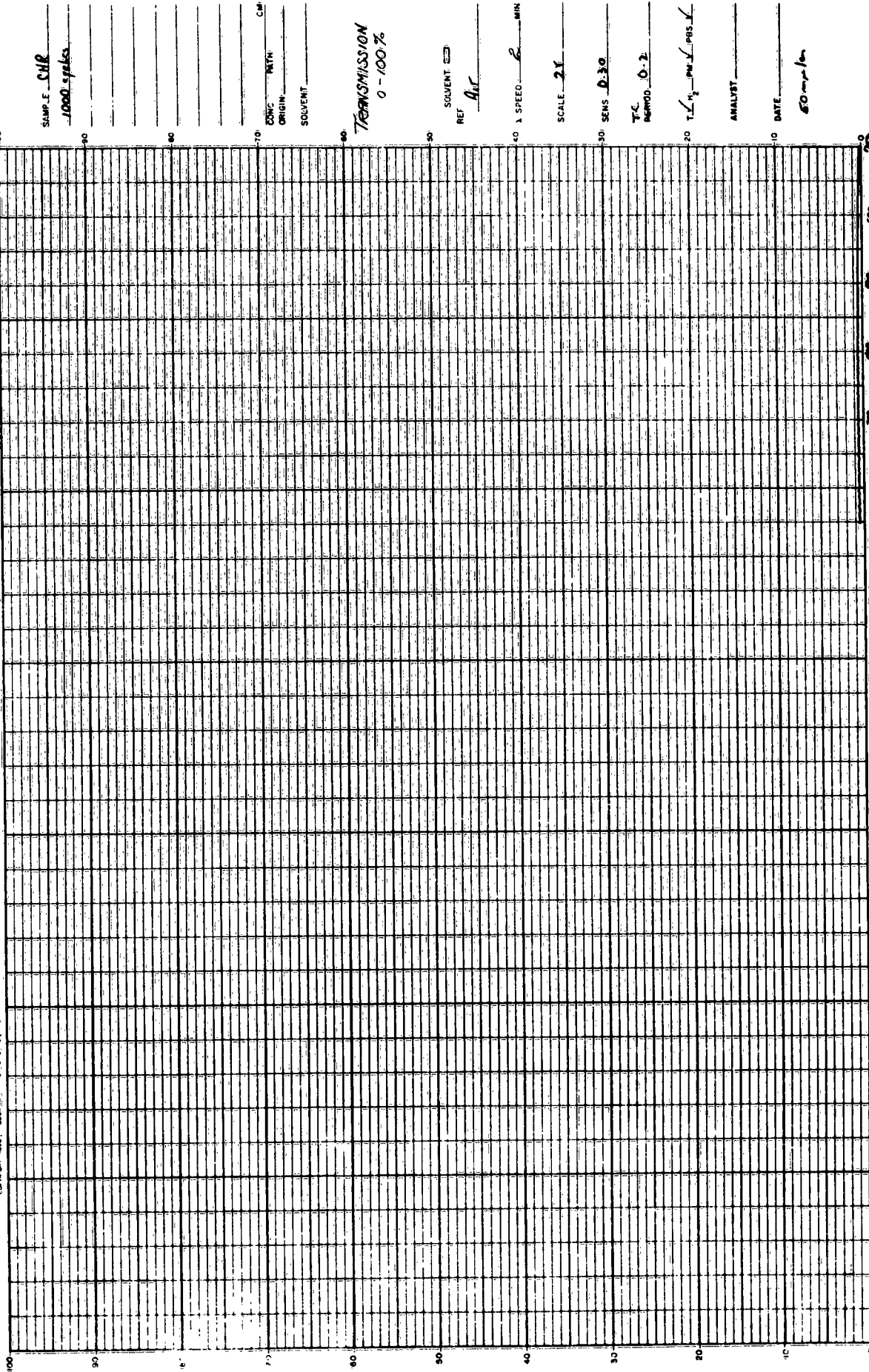
Beckman DK-2 CHART

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CAT NO. 1282



SAMPLE CHR
1000 spectra

CONC 100% CM
ORIGIN 100%
SOLVENT 100%

TRANSMISSION
0 - 100%

SOLVENT 100%
REF 100%

1. SPEED 2 MIN

SCALE 2.5

SENS 0.30

TC 0.2

1. 100% 100% 100%

ANALYST 100%

DATE 100%

60 mμ

WAVELENGTH - mμ

Figure 3

Beckman DK-2 CHART

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SAMPLE CHL
1000 Spectra

C CM
WAVELENGTH CM
SOLVENT CHL

TRANSMISSION

0-100%

SOLVENT ☐
REF CHL

WAVELENGTH CM

SCALE 2X

WAVELENGTH CM

WAVELENGTH CM

WAVELENGTH CM

WAVELENGTH CM

ANALYST

DATE

50 mK

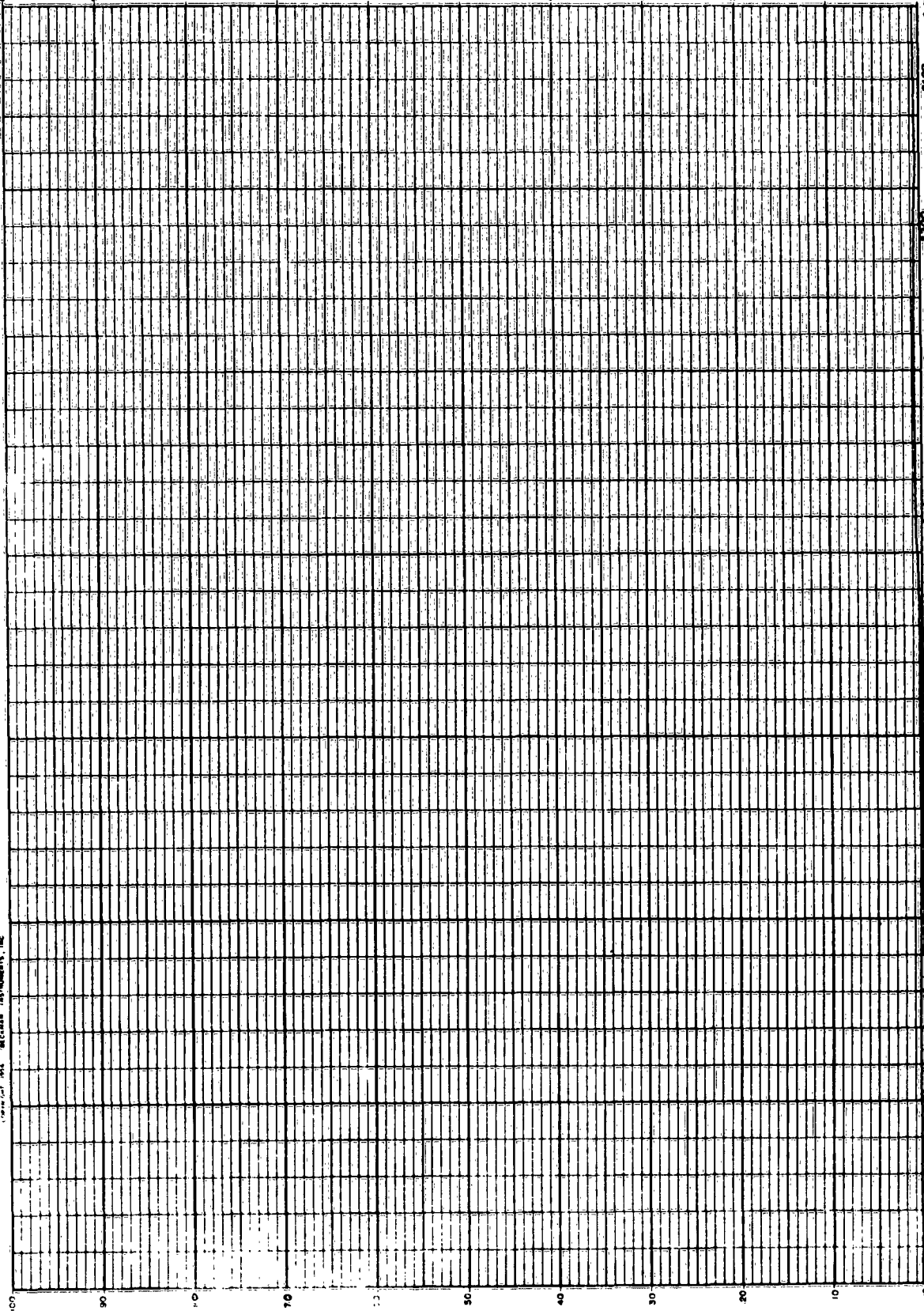


Figure 3 (continued)

Beckman DK-2 CHART

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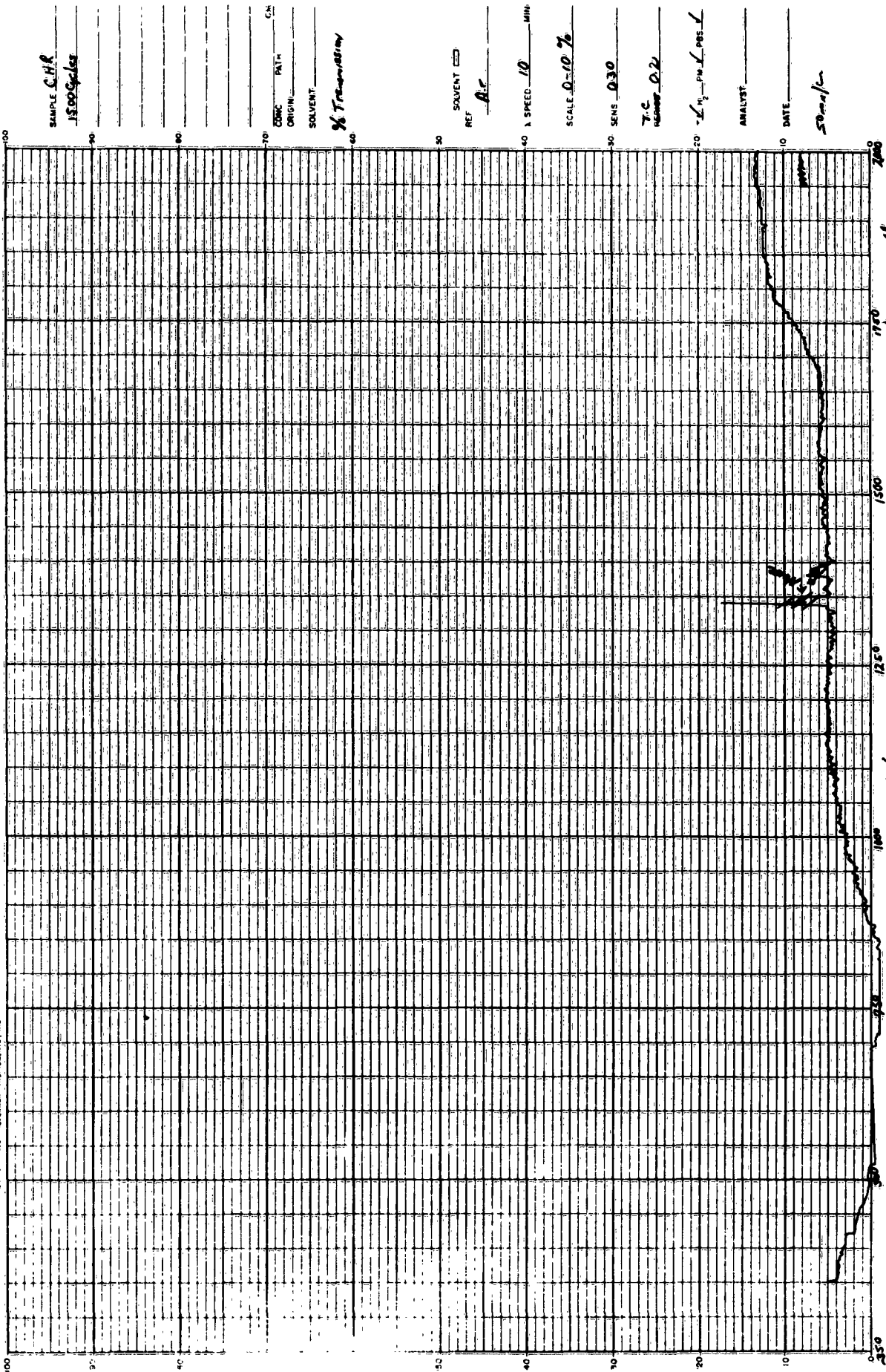


Figure 4

SAMPLE C.H.R.
1800g/100g
 CONC. 10 PATH 1 CM
 ORIGIN ---
 SOLVENT ---
 % Transmission
 SOLENT ---
 REF ---
 SPEED 10 MIN
 SCALE 0-10 %
 SENS 0.30
 T.C. ---
 WAVELENGTH ---
 ANALYST ---
 DATE ---
 SIGNATURE ---

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SAMPLE LA #1

CONC. _____
ORIGIN: _____
SOLVENT: _____

REF SOLVENT

1. SPEED 2 MIN.

SCALE 0-10%

SENS. 2.0'

T.C. 0.2

Time 1:45 PM ✓ P05 ✓

ANALYST _____

DATE _____

Don't/can't

WAVELENGTH - mμ

Figure 5

Beckman DK-2 CHART

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Safe 10-11
Report No. 100

REV. NO. 12842

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SAMPLE LA #6

CONC. 1 PATH CM
ORIGIN 1
SOLVENT 1

TRANSMISSION
0-10%

SOLVENT ☐ REF. AIR

WAVELENGTH 2 MIN.

SCALE 0-10%

SENS 0.30

T.C. 0.2

PERIOD 1 MIN. ☒ PPS ☒

ANALYST 1

DATE 1

50 mm/cm

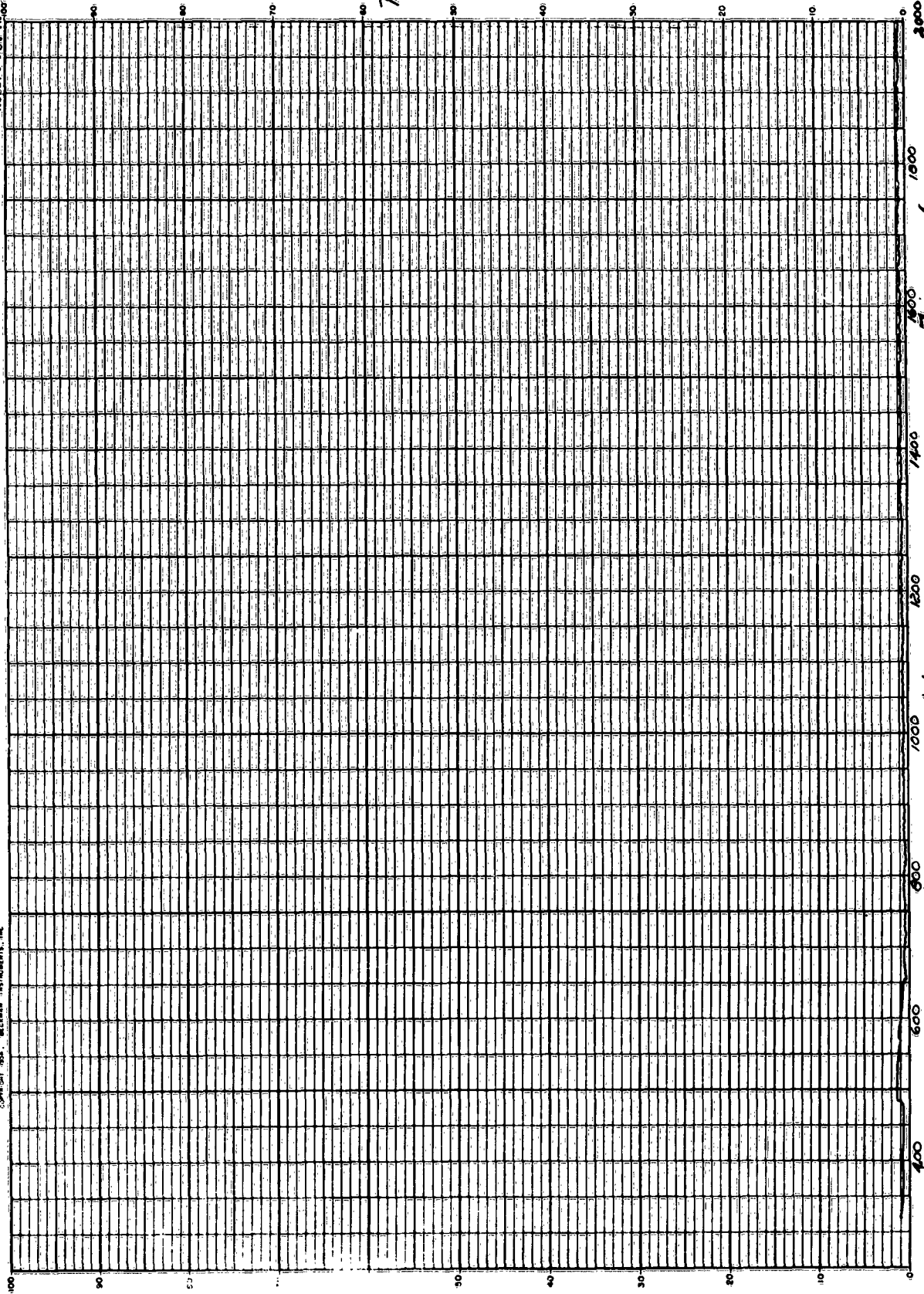


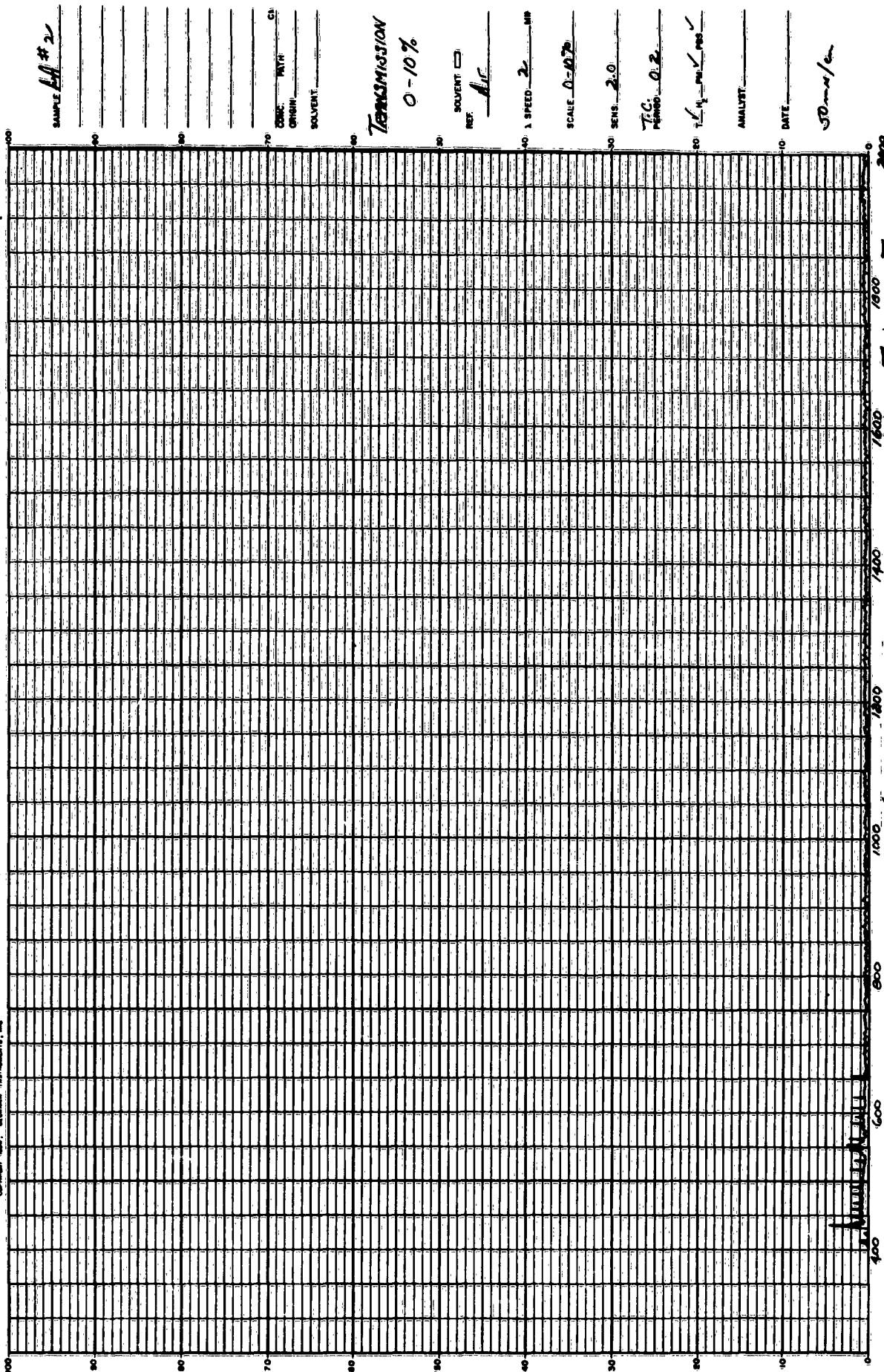
Figure 6

WAVELENGTH - mμ

Beckman DK-2 CHART

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SAMPLE LA #2

CONC. PATH CELL
ORIGIN SOLVENT

TRANSMISSION
0-10%

SOLVENT ☐
REF. AIR

WAVELENGTH 2 MP

SCALE 0-10%

SENS. 2.0

T.C. 0.2

WAVELENGTH 1000 ✓

ANALYST

DATE

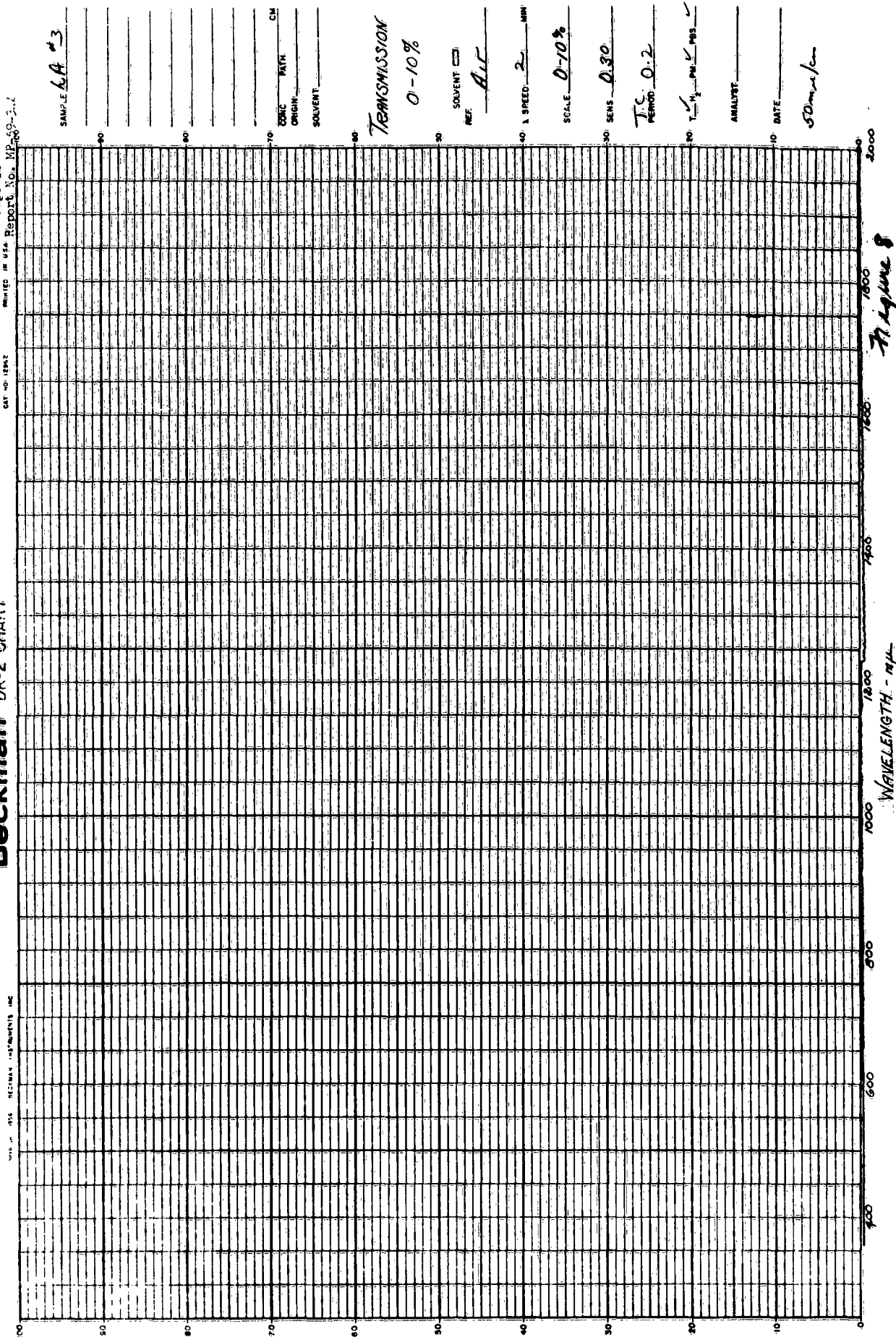
50mm/cu

Figure 7

WAVELENGTH - mμ

Beckman DK-2 CHART

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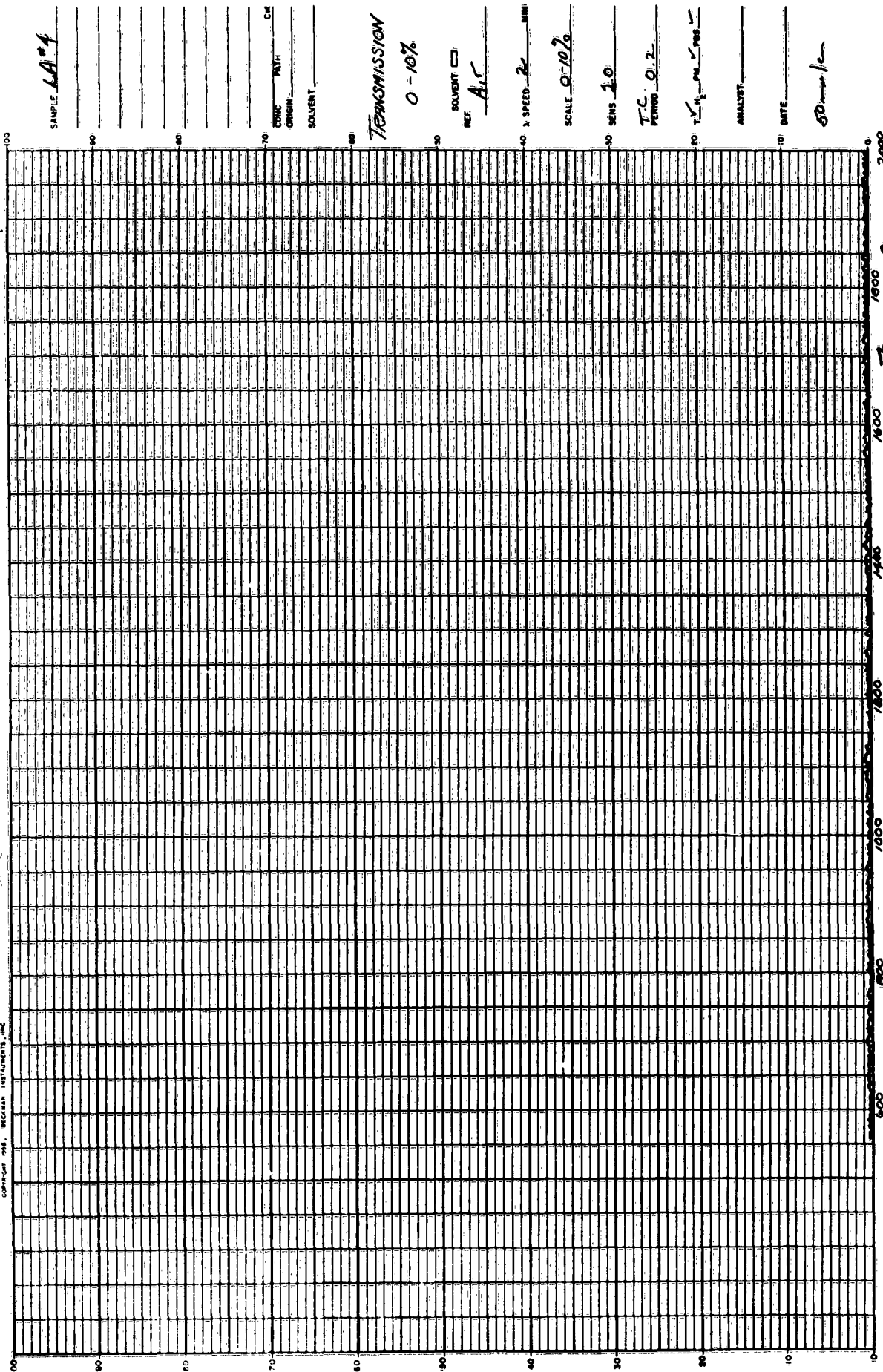


Beckman DK-2 CHART

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SAMPLE LA#4
CONC. 10% PATH 1 CM
ORIGIN _____
SOLVENT _____

TRANSMISSION
0-10%
SOLVENT ☐ REF. AIR

WAVELENGTH 2 MM

SCALE 0-10%

SENS 10

PERIOD 0.2

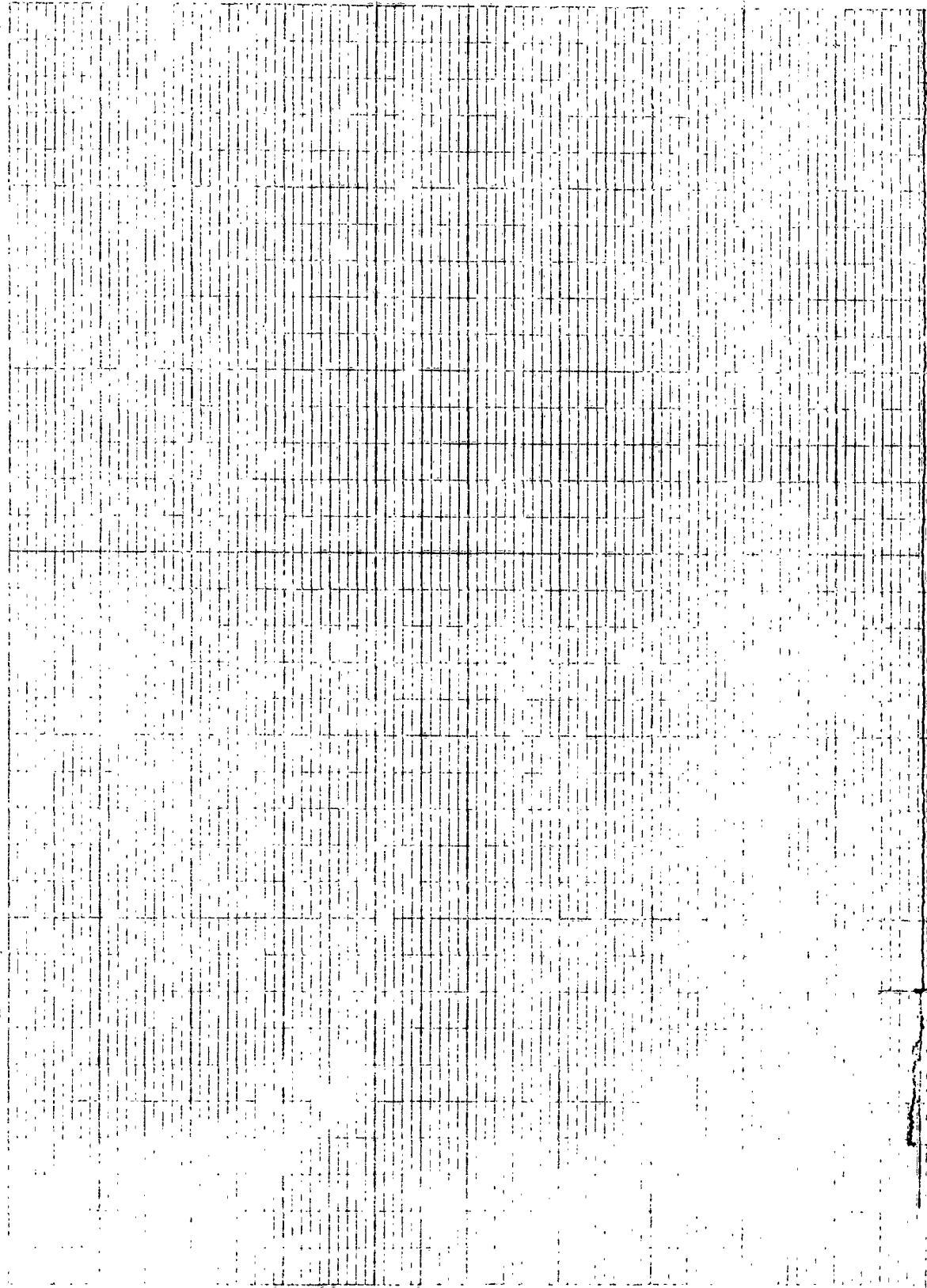
ANALYST _____

DATE 5/20/54

Figure 9

WAVELENGTH - mμ

SECURITY DATA CHART



LA #5

DATE _____
 GRAIN _____
 SOLVENT _____

TEMPERATURE
 0-10%

SOLVENT
 R.R.

2

0-10%

0-30

T.C. 0.2

✓ ✓ ✓

50ml

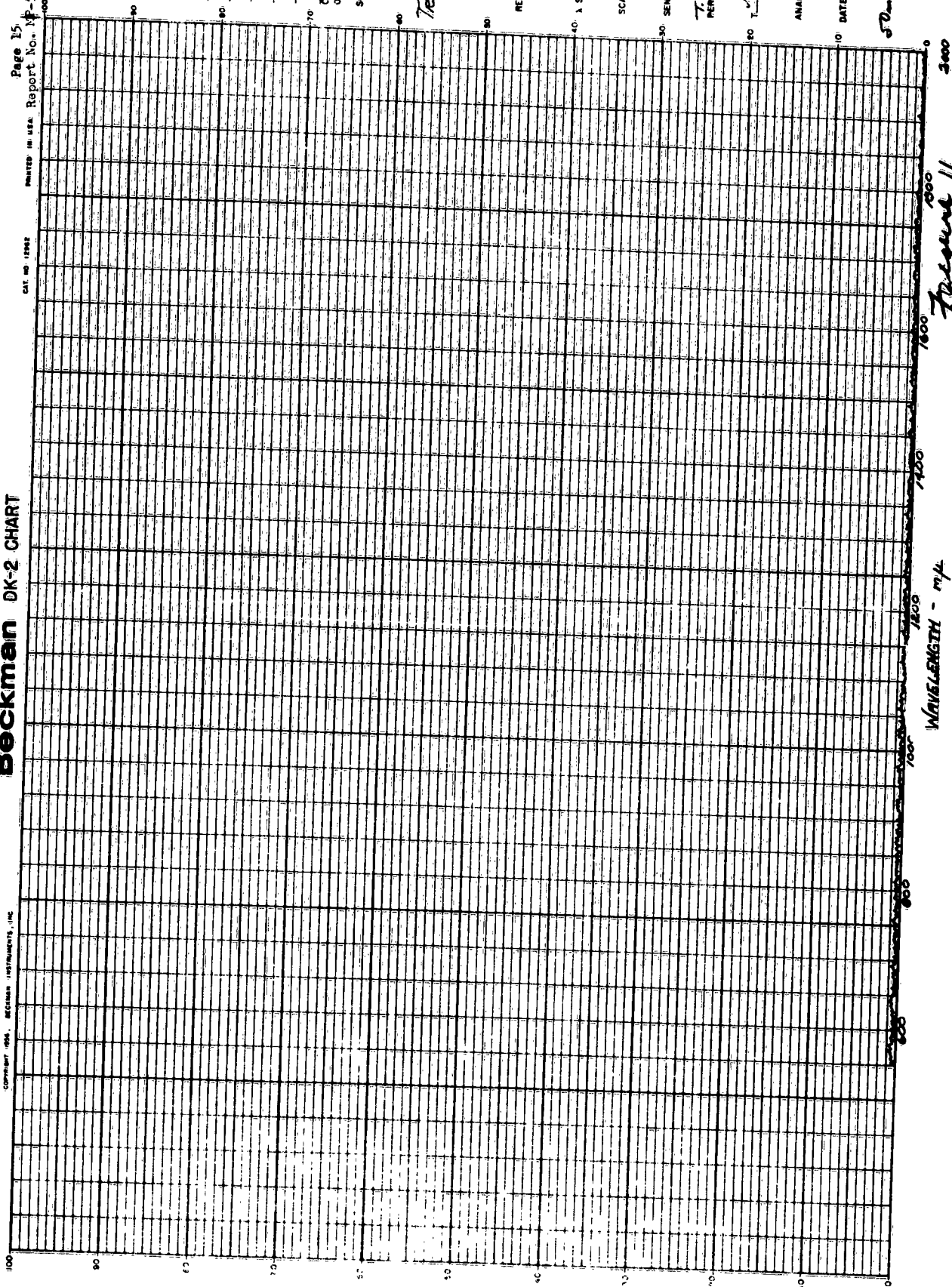
August 10

1000

Beckman DK-2 CHART

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SAMPLE LA^m6

CONC. _____ PATH _____ C.
ORIGIN _____
SOLVENT _____

TRANSMISSION

0-10%

SOLVENT ☐ REF A₁

40 1 SPEED 2 MIN

SCALE 0-10%

30 SENS 2.0

T.C. 0.2
MEMO 0.2

60 T₁ H₂ PO₄ PPS

ANALYST _____

DATE _____

5 Dens/cm

WAVELENGTH - mμ

11